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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/067,587	02/04/2002	Alexander William Simpson	02 P 00543 US	5867

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EXAMINER
VINH, LAN

ART UNIT	PAPER NUMBER
1765	

DATE MAILED: 03/31/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/067,587	SIMPSON ET AL.	
	Examiner	Art Unit	
	Lan Vinh	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-74* is/are pending in the application.

4a) Of the above claim(s) *1-26* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *27-74* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *032604*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group III, claims 27-74 in Paper No. 0304 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Objections

2. Claim 32 objected to because of the following informalities: in line 2 of claim 32, the term "form" appears to be a typographical error, The examiner suggests replacing "form" with--from--. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 27-44 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsu et al (US 6,677,239).

Hsu discloses a CMP method with selective removal rate. This method comprises the step of

contacting a semiconductor substrate in frictional sliding contacting (as seen in fig. 3) with a CMP composition containing DI water, plurality of abrasive particles held in containment or binder material (polymerizable resin such as acrylated epoxies) which abrasives particles are released during polishing, dispersant such as polyacrylic acid/claimed ionizable polylectrolyte may be added to the polishing composition (col 11, lines 6-25, col 12, lines 65-67), which reads on maintaining the surface of the substrate in the presence of an aqueous polishing liquid in frictional sliding contact with a polishing layer comprising friction erodible binder material containing substantially uniformly dispersed therein a plurality of abrasive particles and a water soluble ionizable polyelectrolyte, such as during the polishing of the substrate surface by the polishing layer the binder material is incrementally eroded and in turn the abrasive particles and polyelectrolyte are incrementally released into direct contact with the substrate surface.

continuing the polishing by contacting the substrate surface with an aqueous composition to remove the silicon oxide layer without removing the silicon nitride layer (col 14, lines 15-20), which reads on continuing the maintaining of the substrate surface In the presence of the aqueous polishing liquid until the selective portion of the substrate surface is substantially removed.

Regarding claim 28, Hsu discloses that the polishing composition contains DI water (col 16, lines 7-8)

Regarding claim 30, Hsu discloses that the substrate is a semiconductor wafer (col 10, lines 61-62)

Regarding claims 29, 31, 32, Hsu discloses that the polishing composition contains agents such as acids and various bases (col 12, lines 59-64)

Regarding claims 33-36, Hsu discloses forming a silicon dioxide layer on the wafer surface (col 14, lines 10-12)

Regarding claims 37-38, Hsu discloses forming a conductive layer of copper or aluminum (col 11, lines 3-5)

The limitation of claim 39 has been discussed above

Regarding claim 40, Hsu discloses that the dispersant/polyelectrolyte has a molecular weights from about 1000-20,000 (col 12, lines 66-67) which overlaps the claimed range of 100-1000,000. Hsu also discloses that the binder is polymerizable resin (col 11, lines 17-18)

Regarding claim 41, Hsu discloses that the abrasive particles are alumina, silica, ceria (col 11, lines 10-12)

The limitation of claim 42 has been discussed above

Regarding claim 43, Hsu discloses the abrasive particles (ceria) is disposed in the binder at a concentration between about 1 wt% and about 50 Wt% (col 11, lines 28-30)

Regarding claim 44, Hsu discloses that the abrasive particles having particle sizes between about 0.1 microns/100nm (col 11, lines 10-11), which overlaps the claimed range of 1-20,000 nm.

5. Claims 45-61 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsu et al (US 6,677,239).

Hsu discloses a CMP method with selective removal rate to polish a semiconductor wafer, the wafer having an upper layer 530 of silicon oxide overlying a lower layer 520 of silicon nitride (fig. 5B). This method comprises the steps of:

contacting a semiconductor substrate in frictional sliding contacting (as seen in fig. 3) with a CMP composition containing DI water, plurality of abrasive particles held in containment or binder material (polymerizable resin such as acrylated epoxies) which abrasives particles are released during polishing, dispersant such as polyacrylic acid/claimed ionizable polylectrolyte may be added to the polishing composition (col 11, lines 6-25, col 12, lines 65-67), which reads on maintaining the surface of the substrate in the presence of an aqueous polishing liquid in frictional sliding contact with a polishing layer comprising friction erodible binder material containing substantially uniformly dispersed therein a plurality of abrasive particles and a water soluble ionizable polyelectrolyte, such as during the polishing of the substrate surface by the polishing layer the binder material is incrementally eroded and in turn the abrasive particles and polyelectrolyte are incrementally released into direct contact with the substrate surface.

continuing the polishing by contacting the substrate surface with an aqueous composition to remove the silicon oxide layer 530 exposing the silicon nitride layer 520 without removing any portion of the silicon nitride layer 520 (col 14, lines 15-20, fig. 5B)

Regarding claim 28, Hsu discloses that the polishing composition contains DI water (col 16, lines 7-8)

Regarding claims 46, 55, Hsu discloses that the substrate is a semiconductor wafer (col 10, lines 61-62)

Regarding claims 47, 48, 56, 57, Hsu discloses that the polishing composition contains agents such as acids and various bases (col 12, lines 59-64)

Regarding claims 49, Hsu discloses forming a conductive layer of copper or aluminum (col 11, lines 3-5)

Regarding claim 50, 58, Hsu discloses that the dispersant/polyelectrolyte has a molecular weights from about 1000-20,000 (col 12, lines 66-67) which overlaps the claimed range of 100-1000,000. Hsu discloses that the binder is polymerizable resin (col 11, lines 17-18). Hsu also discloses that the abrasive particles are alumina, silica, ceria (col 11, lines 10-12)

The limitation of claims 51, 59 has been discussed above

Regarding claims 52, 60, Hsu discloses the abrasive particles (ceria) is disposed in the binder at a concentration between about 1 wt% and about 50 Wt% (col 11, lines 28-30)

Regarding claims 53, 61, Hsu discloses that the abrasive particles having particle sizes between about 0.1 microns/100nm (col 11, lines 10-11), which overlaps the claimed range of 1-20,000 nm.

6. Claims 62-74 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsu et al (US 6,677,239).

Hsu discloses a CMP method with selective removal rate to polish a semiconductor wafer, the wafer having an upper layer 530 of silicon oxide overlying a lower layer 520 of silicon nitride (fig. 5B). This method comprises the steps of:

contacting the upper surface of the semiconductor substrate in frictional sliding

contacting (as seen in fig. 3 and fig. 5A) with a CMP composition containing DI water, plurality of abrasive particles held in containment or binder material (polymerizable resin such as acrylated epoxies) which abrasives particles are released during polishing, dispersant such as polyacrylic acid/claimed ionizable polylectrolyte may be added to the polishing composition (col 11, lines 6-25, col 12, lines 65-67), which reads on maintaining the surface of the substrate in the presence of an aqueous polishing liquid in frictional sliding contact with a polishing layer comprising friction erodible binder material containing substantially uniformly dispersed therein a plurality of abrasive particles and a water soluble ionizable polyelectrolyte, such as during the polishing of the substrate surface by the polishing layer the binder material is incrementally eroded and in turn the abrasive particles and polyelectrolyte are incrementally released into direct contact with the substrate surface

continuing the polishing by contacting the substrate surface with an aqueous composition to remove the silicon oxide layer 530 exposing the silicon nitride layer 520 without removing any portion of the silicon nitride layer 520 (col 14, lines 15-20, fig. 5B) a passivation layer 525/removal resistant layer is formed on the silicon nitride layer 520 when exposed to the polishing composition (col 14, lines 1-16), which reads on the electrolyte is released sufficiently for coating the lower silicon nitride layer therewith as the nitride layer becomes exposed during the polishing thereby inhibiting removal of the lower nitride layer.

Regarding claims 63-68, Hsu discloses adding anionic surfactant such as polyethylene oxide to the polishing composition (col 12, lines 16-35)

Regarding claim 69, Hsu also discloses that the abrasive particles are alumina, silica, ceria having particle sizes between about 0.1 microns/100nm (col 11, lines 10-11), which overlaps the claimed range of 1-20,000 nm. Hsu also discloses that the binder is polymerizable resin (col 11, lines 17-18)

Regarding claim 70, Hsu discloses the abrasive particles (ceria) is disposed in the binder at a concentration between about 1 wt% and about 50 Wt% (col 11, lines 28-30)

Regarding claim 71, Hsu discloses that the polishing composition contains DI water (col 16, lines 7-8)

Regarding claims 72, 73, Hsu discloses that the polishing composition contains agents such as acids and various bases (col 12, lines 59-64)

Regarding claims 74, Hsu discloses forming a conductive layer of copper or aluminum (col 11, lines 3-5)

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wang et al (US 6,638,143) discloses a CMP method using an ion exchange resin (col 7, lines 50-55)

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LV
March 26, 2004